This entire field should and must be covered. It is almost entirely unexplored at present, and surely it presents an inviting opportunity for research to those who love to grow plants. We should, if for nothing more than as a matter of duty, take up this work seriously in the very near future and produce for our own use such drug plants as can be grown in our ranges of climate.

Many of the older members of this Academy have in times past displayed considerable interest in this subject, though in recent years we have heard but little from them concerning it. I wish to take this opportunity to invite them to continue this work and also to invite the younger members of the Academy to give it careful consideration, in the hope that before another quarter of a century rolls around Kansas, through her Academy of Science, will have been placed on the map.

In concluding, a series of lantern slides illustrating certain phases of this work were shown.

Patent Laws in Regard to the Protection of Chemical Industry.

L. E. Sayre.

At the time of the last meeting of this Academy chemical manufacturers and many captains of our industries were facing a serious problem of supplies due to war conditions. The situation brought into prominence some questions relating to our patent and copyright laws which had a more or less direct influence upon the stimulation of home production, self-dependence, the stimulation of invention, research, etc. Our laws with reference to this subject, it was believed, needed revision. A rather informal discussion of this subject took place at our annual meeting, which suggested the presentation of the present paper in the hope that, now the war is over, the subject may be still kept alive and some deliberate legislation may be finally obtained which will tend to further the aim above referred to.

There are at least two distinct methods our government has recognized to promote research and invention; one is by subsidy, and the other by patent, trade-mark laws, etc. As a recent example of subsidy, we may cite the appropriations made by Congress for experimental purposes. From the *Congressional Record* we note that for aviation purposes the third session of the Sixty-first Congress, 1911, appropriated $25,000, and in the second session of the Sixty-second Congress, 1912, $20,000; the Sixty-third Congress, 1914, $10,000. Since the first session of the Sixty-fourth Congress, there was appropriated from public funds for aviation purposes over $50,000,000, a large part of which may be considered as subsidy for research and invention.[1]

In every age progress has been obstructed and the beneficient work of inventors set back for a generation by the general apathy and the utter lack of public encouragement and recognition. Who can estimate the incalculable public advantage, the benefits redounding to the general welfare, to industrial progress and the steady advance of science and the arts had the government promptly and generously assisted, by subsidy, in the development and promotion of such epochal inventions as the spinning jenny (1769), the power

1. *Congressional Record,* vol. LV, p. 5129.

loom (1785), the locomotive (1786), gas lighting (1792), cotton gin (1793), steamboat (1796), the reaper (1831), rubber goods (1830-1840), sewing machine (1843), submarine (1878), telephone (1876), airship (1903), etc.

The laws pertaining to patents—the other method of stimulating invention—are too well known to need description, yet the rules relating to them are elaborate and complicated.

These laws might be considered, perhaps, as an indirect method of subsidy; they have been, undoubtedly, in spite of their abuse, a great stimulus to scientific and inventive activity and of much importance in the proper protection of our chemical industries.

W. B. Munro, in his volume, "The Government of the United States," page 283-284, in defining these laws briefly, says:

"Congress is given the power to 'promote the progress of science and the useful arts, by securing for limited times to authors and inventors the exclusive right to their respective writings and discoveries'; in other words, to grant patents and copyrights."

"A patent is a certificate given to an inventor, securing for him during a designated term of years the exclusive right to make such profits as there may be in his invention. . . ."

"Trade-marks have no necessary relation to inventions or discoveries, and do not come within the power to issue patents or copyrights. But the trade-mark used in interstate commerce may be registered in the patent office. When intended for use in trade within a single state they can be protected only by state registration."

"It should be mentioned, moreover, that the granting of a patent does not give an inventor the right to manufacture or to sell his invention except under such conditions as the police power of the states may impose. Even patented articles, if dangerous to safety, health or morals of the community, may be excluded by the laws of any state. The imposition of a license fee by the states for the sale of any article, moreover, would apply as well to patented merchandise as to any other. The right to manufacture or sell is not derived from the patent, and is neither increased nor diminished thereby."

To the physician, pharmacist and chemist, who are familiar with the various types of patented and trade-marked proprietary articles, it seems clear that some reforms are necessary—reforms tending to eliminate unjust discriminations that favor foreign countries, permitting them to utilize our patent and trade-mark laws for building up foreign industries at the expense of our own, and the American people. A protest against this situation has been put forward by several writers. Mr. J. W. England, for example, of the American Pharmaceutical Association,[2] finds the crux of the situation in our system of "product protection." He says:

"The crux of the situation with reference to the patent protection of chemical compounds, more particularly the synthetics, in this country, is to be found in our system of product protection. We not only permit the copyrighting of the title of a chemical compound and the patenting of the process for making it, but—and this is the vital point—we permit the first inventor to patent the product *as such,* and thereby estop all future inventors from marketing the same product, no matter how made.

"It is hardly necessary at this time to cite examples of the thousands of synthetical compounds that are made in Germany and process-patented and product-patented in this country; but, for illustration, we shall call one of these 'X'—and it is a widely used compound. Prior to the European conflict 'X' sold in this country for about 40 or 50 cents an ounce (wholesale), while

2. Jour. Amer. Pharm. Assoc., vol. VI, No. 2; Feb. 1917.

the price in London was equivalent to about 8 or 10 cents an ounce. Therefore, the product protection of chemical compounds *prevents the growth and devolopment of an American industry.*

"'X' cannot be marketed and sold in this country except by the owners of the patent, who have product-patented the compound, even if it be made by an entirely new and original process of manufacture and the process has been patented; this has been decided by the Federal courts.

"But in Germany, for example, 'product patents' are not recognized, and 'X' can be made by any other process than that used originally for making it, and can be marketed.

"Under the United States patent laws no one but the owners of 'X' can market and sell it in this country, and as these owners alone have the monopoly of sale, they can fix the selling price. American manufacturers generally might make this compound by new and original process, but under the consistent rulings of our courts they could not sell the product they made in this country; they could make and sell it in Germany."

From the foregoing it would seem that from the standpoint of the scientist the laws are to be, perhaps, criticised as tending to grant so exclusive a monopoly that further research in the same line is discouraged.

Mr. England suggests six different changes and modifications for the betterment of our patent laws, among the number being that "the Commissioner of Patents should be authorized to 'suspend' the life of a 'product patent' if it can be demonstrated that the product can be made by an entirely new and original process, and it might be desirable to provide, also, that the inventor of the new process shall pay the original inventor an equitable royalty (to be determined by the Commissioner of Patents) so long as the 'life' of the process patent of the original invention lasts. In this way the original inventor could lose no property rights if he has any."

He further suggests that which the writer has learned from those who are quite familiar with the business of the United States Patent Office to be very important (and has been suggested by experts), that "when the issues of a patent case bear upon technical or scientific knowledge and judgment, as do many patent cases, the law should provide a method, both for legal and administrative work, whereby a technical expert or referee or board of referees could be called upon to examine the evidence and report findings of facts, at the expense of the Federal government. The government employs lawyers to pass upon technical questions of law. Why should it not employ technical referees to assist the court to pass judgment upon questions beyond the ability of court and jury to properly understand? If this were done, the technical and scientific defects of patent legislation would be disclosed and remedial measures could be readily adopted. The determination of patent questions is a technical and scientific matter, and the greatest obstacle in the way of patent reform is the ignorance of the legal fraternity, including both the bench and the bar, in the sciences of medicine, pharmacy and chemistry and the arts or technical applications of the same."

This need for patent-law revision and scientific investigation of claims was forcibly presented in a pamphlet published by the American Medical Association in a report of the council of pharmacy and chemistry which referred to letters patent granted for a medicinal preparation May 2, 1916, which preparation was shown to be inactive and which did not have the merit that was claimed for it as a therapeutic agent. In this report the following language is used:

"The council has continued its study of the United States patent law as it

applies to medicine, and has become convinced that in many instances the patent law or its enforcement is contrary to the best interest of the public, both as concerns health and prosperity. The council feels it a duty at this time to protest against the provisions of our patent law, or the methods of its enforcement, which permit the granting of patents without thorough and scientific investigation of the claims advanced in such letters patent."

Few students are better informed as regards those phases of the patent and trade-mark laws which relate to chemistry, pharmacy and medicine than Dr. F. E. Stewart, of Philadelphia. His comments on the Paige bill,[3] which proposed to revise the laws and meet the obvious objections of the present law, are published in the proceedings of the American Pharmaceutical Association, February, 1917. His writings have received favorable comment even from able patent attorneys. It would exceed the limits of this paper to give even a brief review of his comments.

"The Paige bill," he says, "is intended to limit the patenting of certain chemicals mentioned in the bill to processes for their manufacture, leaving the products themselves open to competition, so that others may be stimulated to invent new processes whereby said chemicals may be produced of a better quality or at a lower price during the lifetime of the patent. In other words, no monopoly of the products themselves is permitted, the only monopoly being processes governed by patents." He refers to the course other countries have pursued in relation to product patents in this connection:

"Medicines are excluded from patent protection in Germany, France, Austria-Hungary, Italy, Japan, Denmark, Norway, Sweden, Portugal, Russia and a number of other countries. Other classes of inventions excluded from patent protection in many countries, as well as in Germany, are foods, chemical products, and inventions relating to war material. In all of these countries exclusion from protection of inventions relating to medicines or foods does not generally extend to those relating to processes or apparatus for their manufacture. In all foreign countries which exclude chemical products from protection, except Switzerland, inventions relating to chemical processes may be patented, and in nearly all such countries it is expressly provided by law that a patent for a chemical process by which a new chemical product is made shall in effect cover such product, unless it be shown that such product was made in fact by some other process. In other words, when a new product is discovered, and a process of manufacture is patented, no person is permitted to compete with the original patentee unless he is able to show that the process he is to employ for that purpose is not an infringement upon the patented process. The German patent law excepts from patent protection (1) inventions the application of which is contrary to the laws or public morals; (2) inventions relating to articles of foods, whether for nourishment or for enjoyment, and medicines, as also substances prepared by chemical processes, in so far as the inventions do not relate to a definite process for the preparation thereof. Patents are granted, however, for processes and apparatus for manufacture, and section 35 provides a method for protecting inventors of processes for the production of new substances in the following manner: 'If the invention relates to a process for the production of a new substance, all substances of like nature are considered as having been made by the patented process until proof to the contrary is given.'

"The Paige bill seeks to remedy one serious objection to our patent law by making it necessary for foreign patentees to manufacture their products in this country within two years after the patents have been granted. . . . Product patents have been granted by the United States to foreign manufacturers without insisting that the manufacture of such products shall be carried on in this country."

3. Bill known as H. B. 11967, a bill to amend sections 4886 and 4887 of the Revised Statutes relating to patents.

This being the case, Doctor Stewart says:

"It becomes evident that our patent law as now interpreted and applied does not promote progress in the arts of chemistry, pharmacy and drug therapeutics as carried on in the United States; in fact, it is very serious hindrance both to science and to the arts referred to. It hinders science because it does not stimulate original research on the part of would-be inventors in this country. Neither does it build up United States industries."

The writer has endeavored to find out the fate of the Paige bill. He understood that it had been locked up in the committee and has not yet been taken out. A letter received from a large manufacturer, dated April 4, 1919, says:

"The most we can say of the Paige bill and all others before the Sixty-fifth Congress, not passed, died with that body on the fourth of March last. The slate is therefore absolutely clean. What will be introduced in the next Congress no one can, of course, foresee; but the excuse that legislation that will discriminate against American chemists and pharmacists is needed to protect the public against the rapacity of the German owners of certain synthetic products no longer exists. In the opinion of the American Drug Manufacturers' Association, which met at New York last week, no amendment to the present substantive patent law is needed; but a patent court should be provided with country-wide jurisdiction to correct the present conflict between decisions in districts and circuits of limited territorial jurisdiction."

It has been urged before the Commission on Patents, says Doctor Stewart, that—

"The United States patent law should be amended to exclude from patent protection both medicines and chemical products generally, at least in so far as such inventions are the inventions of subjects or citizens of the foreign countries which exclude this class of inventions from patent protection, and it was contended then, and has been the contention ever since, that subjects or citizens of foreign countries should not be allowed to receive in this country patents for inventions which are not patentable in their own country. Thus far the German manufacturing houses have been able to defeat this very desirable legislation. It has been argued that certain treaties between the United States and Germany which give us certain advantages will have to be abrogated to permit such a change in the law. It would seem to me that this question of treaty should be carefully looked into by Congress for the purpose of ascertaining the truth in regard to the matter and for the purpose of publishing the truth, so that the American people may have an opportunity to decide whether or not we are gaining more than we are losing by such a treaty as the one urged as an excuse for not so revising the patent law as to protect American inventors from what appears to be such unfair competition. If the United States government should conclude to limit patents to processes only, surely something should be done to throw the burden of proof upon those claiming to have invented new processes for producing the same products as those produced by the patented processes."

This latter point we feel is well taken and should be one item for revision, namely: The inventor of a new process should be required to assume the burden of proof and establish the fact that his process is no infringement, and not throw this burden of proof on the original inventor.

If such wise procedure were adopted it would seem to indicate and emphasize what has been suggested—the advisability of some kind of advisory and coöperative board of scientists that would not only assist in solving such problems, but would materially aid in the aims and objects of those who create and administer patent and copyright laws.

We all know that before laws can be executed they must be enacted, and that before they are enacted they should be discussed and thoroughly in-

vestigated. Now all laws dealing with inventions and discoveries are executed by the Patent Office, enacted by Congress, and investigated thoroughly by nobody in particular.

To establish a commission to investigate matters of a highly scientific nature and to advise Congress is nothing more than doing what is now being done in the field of art. We have established (May 17, 1910) a "National Commission of Fine Arts" to advise Congress regarding the building of national memorials and buildings. Members of Congress are not artists, and so seek the advice of these trained commissioners. Neither are the members of Congress scientists, and so should have such a body to refer to in order to promote the progress of science as well as the fine arts.

The multiplication of advisory boards and commissions is the subject of much criticism to-day. We find ourselves afraid to establish one authoritative body, and we forget that we have established, under guise of "winning the war" a commission to investigate "Garabed"; a "Naval Consulting Board" under the leadership of Thomas A. Edison, and a "National Advisory Committee for Aëronautics," not to mention many other such bodies.

Now that the war is over, a centralization of these boards and commissions is needed, so that we will have one body to investigate and advise Congress—one body to promote the progress of science, encourage invention and give technical help to Congress for the revision of patent law.

Such a board would find many points other than those presented needing revision. There is need, for example, of correction in the line of advertised trade-marked and so-called protected "secret preparations" and "proprietaries." A clear distinction should be made, that everybody could understand, between a patented chemical, a "copyrighted" or trade-marked proprietary article, and "patent medicine," which latter title, in the eyes of the scientist, is extremely ludicrous.

In conclusion permit me to say that now the war is over, and many of the irritations in connection with the patent laws subsided, there is a chance that we lose interest in this important subject. While public sentiment may do much, in spite of inefficient laws, to correct unfairness and abuse, little can be hoped for until wise revisions are perfected. The incentive in presenting the present paper has been coupled with the hope that the subject may be kept alive and agitated and that the interest in it may be widened.

Another concluding remark: Chemists in this country and Canada are now endeavoring to accomplish through subsidy what is fundamentally the aim of our patent laws. Canada is considering the formation of a guild, which will be properly supported, for the purpose of carrying on research of interest to the trade. The American Chemical Society is proposing a national institute for drug research as one of its objects, which will aim to acquire more definite knowledge of the action of drugs upon the human body. The society is asking for a fund of $10,000,000 for its scheme. The American Pharmaceutical Association is likewise proposing to enter upon this important field of investigation of medicinal chemicals. It is fair to assume that the future looks very promising, since so much interest is now being taken in this general subject of research and investigation.